

92. (New) An information recording medium for recording already-recorded real-time data and real-time data to be appended in such manner that real-time data including the already-recorded real-time data and the real-time data to be appended are continuously reproducible by a playback reference model, the real-time data comprising at least one of video data and audio data,

wherein the playback reference model includes:

a pickup for reading the real-time data from the information recording medium; a buffer memory for temporarily storing the real-time data read by the pickup; and a decoder module for reading the real-time data from the buffer memory for processing,

wherein the information recording medium comprises a volume space for at least recording in sectors a file comprising data and file management information for managing the file; and the already-recorded real-time data is recorded in at least one real-time extent, each of which is allocated with logically contiguous sectors within the volume space, wherein:

the real-time data is compressed in an MPEG format;

the already-recorded real-time data comprises first data and second data;

the first data and the second data each include at least one GOP;

the second data is positioned at an end of the already-recorded real-time data;

data obtained by re-encoding the second data which has been read in such a manner that the second data and the real-time data to be appended are seamlessly reproducible is designated as third data;

an area comprising the first data is designated as an end of the already-recorded real-time data; and

the real-time data to be appended is appended on the information recording medium by a method comprising the steps of:

calculating whether or not an underflow will occur in the amount of data stored in the buffer memory if the playback reference model accesses from one of the at least one real-time extent to one of at least one newly-allocated pre-allocated area, the calculation being performed with respect to each of the at least one real-time extent beginning from one of the at least one real-time extent, which is positioned last along a

reproduction direction in which the already-recorded real-time data is reproduced, and proceeding in a direction opposite to the reproduction direction;

when it is calculated that an underflow will occur, searching, among the at least one real-time extent, every real-time extent that will cause the underflow and every real-time extent that will not cause the underflow on accessing the one of the least one pre-allocated area;

recording, in the at least one pre-allocated area, the underflow data which is already recorded in said every real-time extent that will cause an underflow, the third data, and the real-time data to be appended; and

designating as a new real-time extent, an area among the at least one pre-allocated area in which the underflow data, the third data, and the real-time data to be appended, and recording the file management information for managing the real-time data to be appended and the already-recorded real-time data in the volume space.

93. (New) A method for appending already-recorded real-time data and real-time data to be appended on an information recording medium in such a manner that real-time data including the already-recorded real-time data and the real-time data to be appended are continuously reproducible by a playback reference model, the real-time data comprising at least one of video data and audio data,

wherein the playback reference model includes:

a pickup for reading the real-time data from the information recording medium; a buffer memory for temporarily storing the real-time data read by the pickup; and a decoder module for reading the real-time data from the buffer memory for processing,

wherein the information recording medium comprises a volume space for at least recording in sectors a file comprising data and file management information for managing the file; and the already-recorded real-time data is recorded in at least one real-time extent, each of which is allocated with logically contiguous sectors within the volume space, wherein:

the real-time data is compressed in an MPEG format;

the already-recorded real-time data comprises first data and second data;

the first data and the second data each include at least one GOP;  
the second data is positioned at an end of the already-recorded real-time data;  
data obtained by re-encoding the second data which has been read in such a manner that the second data and the real-time data to be appended are seamlessly reproducible is designated as third data;

an area comprising the first data is designated as an end of the already-recorded real-time data; and

the method comprises the steps of:

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calculating whether or not an underflow will occur in the amount of data stored in the buffer memory if the playback reference model accesses from one of the at least one real-time extent to one of at least one newly-allocated pre-allocated area, the calculation being performed with respect to each of the at least one real-time extent beginning from one of the at least one real-time extent, which is positioned last along a reproduction direction in which the already-recorded real-time data is reproduced, and proceeding in a direction opposite to the reproduction direction;

when it is calculated that an underflow will occur, searching, among the at least one real-time extent, every real-time extent that will cause the underflow and every real-time extent that will not cause the underflow on accessing the one of the at least one pre-allocated area;

recording, in the at least one pre-allocated area, the underflow data which is already recorded in said every real-time extent that will cause an underflow, the third data, and the real-time data to be appended; and

designating as a new real-time extent, an area among the at least one pre-allocated area in which the underflow data, the third data, and the real-time data to be appended, and recording the file management information for managing the real-time data to be appended and the already-recorded real-time data in the volume space.

94. (New) An information recording apparatus for appending already-recorded real-time data and real-time data to be appended on an information recording medium in such a manner that real-time data including the already-recorded real-time data and the real-time data to be appended are continuously reproducible by a playback reference model, the real-time data comprising at least one of video data and audio data,

wherein the playback reference model includes:

a pickup for reading the real-time data from the information recording medium; a buffer memory for temporarily storing the real-time data read by the pickup; and a decoder module for reading the real-time data from the buffer memory for processing,

wherein the information recording medium comprises a volume space for at least recording in sectors a file comprising data and file management information for managing the file; and the already-recorded real-time data is recorded in at least one real-time extent, each of which is allocated with logically contiguous sectors within the volume space, wherein:

the real-time data is compressed in an MPEG format;

the already-recorded real-time data comprises first data and second data;

the first data and the second data each include at least one GOP;

the second data is positioned at an end of the already-recorded real-time data;

data obtained by re-encoding the second data which has been read in such a manner that the second data and the real-time data to be appended are seamlessly reproducible is designated as third data;

an area comprising the first data is designated as an end of the already-recorded real-time data; and

the apparatus further comprises:

a data amount calculation section for calculating whether or not an underflow will occur in the amount of data stored in the buffer memory if the playback reference model accesses from one of the at least one real-time extent to one of at least one newly-allocated pre-allocated area, the calculation being performed with respect to each of the at least one real-time extent beginning from one of the at least one real-